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PENSOFT.

Unknown diversity: survey of Neuroptera (Insecta) in Paraná, southern Brazil, reveals 14 species newly recorded from the state and country

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Abstract

The PROFAUPAR project (1986–1987) studied insect diversity in the Atlantic rainforest through collections made at eight different sites in the state of Paraná, Brazil. Here, we review and identify the collected neuropterans, carry out a bibliographic review, and compose a list of the Neuroptera species that occur in the state. This study includes 14 new records in Paraná, including the first records of Ascalaphinae (Myrmeleontidae) and a new record of Dilaridae for Brazil. It increases by 29.2% the number of species of Neuroptera known from Paraná. Forty-seven Neuroptera species are now known to occur in the state.

Keywords

Checklist, lacewings, Neuropterida, owlflies, Paraná, PROFAUPAR

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Introduction

The order Neuroptera (Insecta, Neuropterida), commonly known as lacewings and antlions, has a cosmopolitan distribution (except for Antarctica) and comprises approximately 5,800 species distributed in 15 families, of which nine occur in Brazil (Oswald and Machado 2018; Machado et al. 2019). This relatively small order of insects is represented in Brazil by 426 species (Machado and Martins 2021) and despite the fact that in South America, Brazil is the country with the greatest diversity (Martins 2019), studies dealing with these insects are relatively scarce.

In the past, studies focusing on Brazilian Neuroptera were mostly concentrated in the Amazon region, mainly due to the series of papers published by Dr. Norman D. Penny (e.g., Penny 1981; Meinander and Penny 1982; Adams and Penny 1985), but more recently a growing body of records of new species have been established in other regions of the country (e.g., Martins and Amorim 2015; Silva and Freire 2015; Assmar and Salles 2017; Alvim et al. 2019; Machado and Tavares 2020). However, there have been no large-scale surveys of the Brazilian Neuroptera published to date. Paraná state, located in southern Brazil, is dominated by the Atlantic rainforest, where the neuropterofauna is certainly understudied despite faunistic surveys in this biodiversity hotspot.

The "Levantamento da Fauna Entomológica no Estado do Paraná" (PROFAUPAR) [Survey of Entomological

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Fauna in Paraná State] was a project conducted during a one-year period from 1986 to 1987 at eight collection sites on the coast and the three plateaus in the Paraná state (Marinoni and Dutra, 1991). A total of 2,470,160 specimens belonging to various orders of insects were collected (Marinoni and Dutra 1991), and the data on the fauna composition have been subsequently published by several authors studying insect groups such as Lepidoptera (Marinoni and Dutra 1996; Marinoni et al. 1997; Marinoni et al. 1999), Trichoptera (Marinoni and Almeida 2000), Diptera (Costacurta et al. 2003), Hymenoptera (Azevedo et al. 2006), and Coleoptera (Fernandes and Linzmeier 2012). The insect specimens collected during the project also allowed for the descriptions of new species, like the seed beetle *Amblycerus profaupar* Ribeiro-Costa, 2000 (Coleoptera, Bruchidae) (Ribeiro-Costa, 2000) and for the updating of the known distributions of other species (Turcatel et al. 2007; Fernandes and Linzmeier 2012).

The PROFAUPAR project was, and still is, the only large-scale study to sample the order Neuroptera in the Paraná state. However, the data on this order has not yet been published, which was mainly due to the absence of a specialist in the group in Brazil. Recently we had access to the lacewing material in the PROFAUPAR samples. This material was identified and found to include several species newly recorded from Paraná. Thus, we present a list of these species new for the state and including a species recorded from Brazil for the first time. These data include important information on the biodiversity of Neuroptera in the Paraná and will assist in future studies.

Methods

The insects were collected in eight localities in the state of Paraná (Fig. 1) between August 1986 and July 1987 using the "ESALQ" light trap (Marinoni and Dutra 1991). The samples were taken every two weeks, preserved in 70% ethanol, and stored in the Entomological Collection Padre Jesus Santiago Moure (DZUP) housed at the Universidade Federal do Paraná, Brazil. Detailed descriptions of the collection localities (floristics, climate, and phytogeographic classification) were described by Marinoni and Dutra (1991). The locations of the eight sampled areas are indicated in the map (Fig. 1), which was built using Simplemappr (Shorthouse 2010).

Only adults were collected, and these insects were studied with a stereomicroscope to observe the external anatomy and terminalia, and were identified at the lowest possible taxonomic level with the help of dichotomous keys for the respective groups (Osmylidae: Martins et al. 2019; Mantispidae: Machado and Rafael 2010a; Chrysopidae: Freitas and Penny 2001; Breitkreuz 2018; Myrmeleontidae: van der Weele 1908; Navás 1912; Penny 1981; Stange 1994; Ábrahám 2013; Hemerobiidae: Penny and Monserrat 1983; Dilaridae: Adams 1970; Machado and Rafael 2010b; Sisyridae: Assmar and Salles 2017; Coniopterygidae: Martins and Amorim 2016). Terminology follows Aspöck and Aspöck (2008) for genitalia and Breitkreuz et al. (2017) for the wing venation. Due to difficulties with identification, such as the fragility of the material preserved in alcohol for years, and taxonomic problems within some groups, some insects were not identified to species. We also carried out a bibliographic

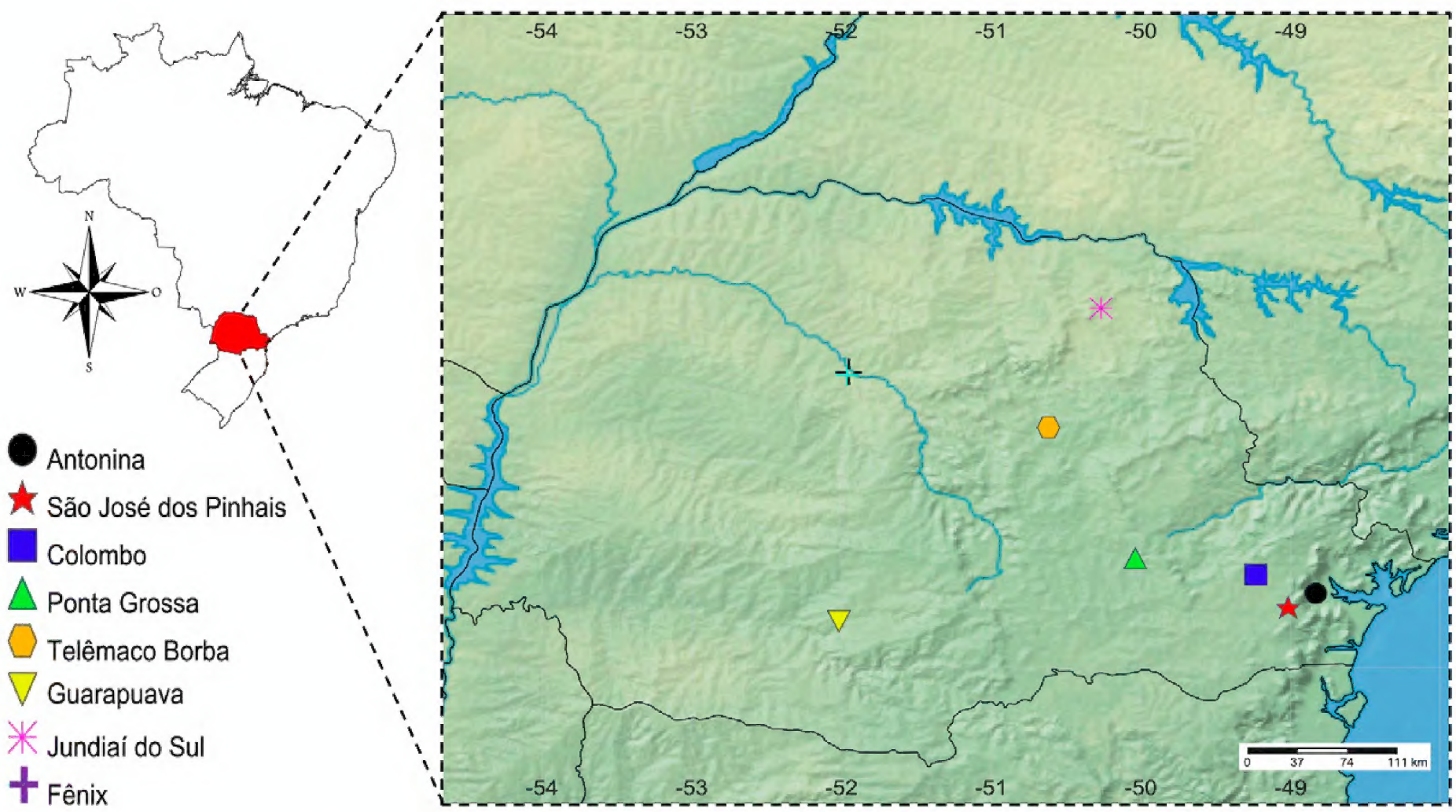

Figure 1. Map of Brazil (left) and Paraná state (right) with the sampled locates of the PROFAUPAR. Antonina (25°28′00″S, 048°50′00″W); São José dos Pinhais (25°34′00″S, 049°01′00″W); Colombo (25°20′00″S, 049°14′00″W); Ponta Grossa (25°13′02″S, 050°02′14″W); Telêmaco Borba (24°17′00″S, 050°37′00″W); Guarapuava (25°40′00″S, 052°01′00″W); Jundiaí do Sul (23°26′00″S, 050°16′00″W); Fênix (23°54′51″S, 051°57′45″W).

review of the species known to occur in Paraná; this was based on the "Catálago Taxonômico da Fauna do Brasil" (Machado and Martins 2021) and additional literature.

Results

During the project 256 insects of the order Neuroptera were collected. The most abundant families were Sisyridae (n = 76; 29.68%), Chrysopidae (n = 60; 23.43%), Hemerobiidae n = 54; 21.09%), and Myrmeleontidae (n = 46; 17.96%) (Appendix, Table A1). Previous to this study, only 34 species of Neuroptera were known to occur in Paraná (Table 1), but with the new data provided here, we add 14 additional species in the state and one additional species in Brazil.

Newly recorded species in Paraná

Order Neuroptera Linnaeus, 1758
Family Chrysopidae Schneider, 1851
Subfamily Nothochrysinae Navás, 1910
Genus *Asthenochrysa* Adams & Penny, 1992

***Asthenochrysa* sp.**

Material examined. BRAZIL – **Paraná** • Fênix, Reserva Estadual Vila Rica (ITCF); 23°54′51″S, 051°57′45″W; 02.XI.1986; RC Marinoni and RRC Dutra leg.; light trap; 1 ♀; DZUP 381713; PROFAUPAR.

Identification. Three genera of Nothochrysinae occur in South America: *Asthenochrysa*, *Leptochrysa* Adams & Penny, 1992, and *Nothochrysa* McLachlan, 1868 (Tauber 2019). According to Adams & Penny (1992), *Asthenochrysa* can be identified by having antennae with the flagellar segments with five setal rows and by the lack of fusion of the second and third anal veins of the forewing. *Asthenochrysa* differs from *Leptochrysa* by the geographic distribution and the absence of uniquely narrow wings, rectangular gradate cells, and a distinctive intramedian cell, which make this genus distinct from other Nothochrysinae. *Asthenochrysa* can be separated from *Nothochrysa* by its geographic distribution; the latter has a single species in Chile (Tauber 2019). *Asthenochrysa* larvae are still unknown (Tauber 2019).

Comments. The specimen reported here most likely belongs to *A. viridula* (Adams, 1978), the only species described for the genus and the only nothochrysine species known from Brazil. However, specific identification is made difficult because it is based on the male terminalia. *Asthenochrysa* was included by Machado and Martins (2021) in a catalog of Neuroptera from the state, but this was based on personal observations of the researchers responsible for updating the "Catálogo Taxonômico da Fauna do Brasil" (C. Martins pers. comm.). Thus, the material examined here represents the first fully documented record from the state.

Updated distribution in Brazil. Paraná.

Subfamily Chrysopinae Schneider, 1851
Tribe Belonopterygini Navás, 1913
Genus *Nacarina* Navás, 1915

***Nacarina sagitta* de Freitas & Penny, 2001**

Material examined. BRAZIL – **Paraná** • Fênix, Reserva Estd. de Vila Rica (ITCF); 23°54′51″S, 051°57′45″W; 04.X.1986, 02.XI.1986, 29.XI.1986; 3 ♀ and 3 ♂, DZUP 381739; DZUP 381740, DZUP 381742; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • Telêmaco Borba, Reserva Biológica Klabin; 24°17′00″S, 050°37′00″W; 29.III.1987; 1 ♂; DZUP 381738; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR.

Identification. The specimens were identified by the combination of the following characters: apical segment of maxillary palps tubular, head without dark markings, and genital characteristics as presented in Freitas and Penny (2001).

Comments. According to Freitas and Penny (2001), *Nacarina* is the most common genus of the tribe Belonopterygini, with most species of the genus distributed in South America.

Updated distribution in Brazil. Paraná, São Paulo.

Tribe Chrysopini Schneider, 1851
Genus *Plesiochrysa* Adams, 1982

***Plesiochrysa brasiliensis* (Schneider, 1851)**

Material examined. BRAZIL – **Paraná** • Fênix, Reserva Estd. de Vila Rica (ITCF); 23°54′51″S, 051°57′45″W; 02.XI.1986; 1 ♂; DZUP 381737; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • Ponta Grossa, Vila Velha res. IAPAR BR 376; 25°13′02″S, 050°02′14″W; 01.I.1987; 1 ♂; DZUP 381735; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR.

Identification. The genus is recognized by the presence of red spots on the pronotum and externally visible genital characteristics as shown by Freitas and Penny (2001). This species can be recognized principally by the pale antennal flagellum and the equal width and length of the pronotum, which has the lateral spots separated.

Comments. *Plesiochrysa* contains four species in Brazil (Machado and Martins 2021) and none had been recorded from Paraná until now. Tauber et al. (2001) described the biology and immature stages of *P. brasiliensis*.

Updated distribution in Brazil. Amazonas, Distrito Federal, Maranhão, Minas Gerais, Pará, Paraná, Rio de Janeiro, São Paulo, Santa Catarina.

Family Coniopterygidae Burmeister, 1839
Subfamily Coniopteryginae Burmeister, 1839
Tribe Coniopterygini Burmeister, 1839
Genus *Coniopteryx* Curtis, 1834
Subgenus *Scotoconiopteryx* Meinander, 1972

***Coniopteryx* (*Scotoconiopteryx*) *tucumana* Navás, 1930**

Materials examined. BRAZIL – **Paraná** • São José dos

Table 1. Neuroptera recorded from the state of Paraná, Brazil, and the main source of occurrence information. Genera and species indicated with an asterisk (*) represent new records for the state of Paraná, two asterisks (**) represent new records for Brazil.

Taxon	Locality	Sources
Chrysopidae		
Asthenochrysa Adams & Penny, 1992 *	Fênix	This study
Chrysoperla externa (Hagen, 1861)	Rio Negro	Cardoso et al. 2003
Ceraeochrysa acmon Penny, 1998	Foz do Iguaçu	de Freitas et al. 2009
Chrysopodes hagenorum Tauber et al., 2012	Foz do Iguaçu	Tauber et al. 2012
Leucochrysa (*Nodita*) *intermedia* (Schneider, 1851)	Rio Negro	Cardoso et al. 2003
Leucochrysa (*Nodita*) *vieirana* Navás, 1913	Rio Negro	Cardoso et al. 2003
Nacarina sagitta de Freitas & Penny, 2001*	Fênix, Telêmaco Borba	This study
Plesiochrysa sp. Adams, 1982 *	Fênix, Jundiaí do Sul, São José dos Pinhais, Guarapuava.	This study
Plesiochrysa brasiliensis (Schneider, 1851) *	Fênix, Ponta Grossa	This study
Coniopterygidae		
Coniopteryx (*Xeroconiopteryx*) *paranana* Meinander, 1990	Curitiba	Meinander 1990
Coniopteryx (*Coniopteryx*) Meinander, 1972	Curitiba	Meinander 1990.
Coniopteryx (*Scotoconiopteryx*) *tucumana* Navás, 1930 *	São José dos Pinhais	This study
Dilaridae		
Nallachius limai Adams, 1970	Piraquara, Tijuca do Sul, Tiról das Torres	Machado and Rafael 2010b
Nallachius reductus Carpenter, 1947 **	Fênix	This study
Hemerobiidae		
Hemerobius bolivari Banks, 1910	São Mateus do Sul	Lara and Perioto 2003; Lara and Perioto 2016
Hemerobius domingensis Banks, 1941	Cascavel	Lara and Perioto 2003; Lara and Perioto 2016
Hemerobius gaitoi Monserrat, 1996	Terra Boa	Monserrat 1996
Megalomus impudicus (Gerstaecker, 1888)	Paraná	Lara and Perioto 2016
Nusalala ilusionata Monserrat, 2004	Paraná	Lara and Perioto 2016
Nusalala tessellata (Gerstaecker, 1888)	Cascavel, São Matheus do Sul	Lara and Freitas 2003
Sympherobius sp. Banks, 1905 *	Colombo	This study
Mantispidae		
Anchieta fumosella (Westwood, 1867)	Campo Largo, Ponta Grossa, Fênix	Carvalho and Corseuil 1991; Alvim et al. 2019; this study
Climaciella semihyalina (Le Peletier & Audinet-Serville, 1825)	Guaraúna (Teixeira Soares)	Penny and da Costa 1983
Dicromantispa gracilis (Erichson, 1839)	Colombo	Machado and Rafael 2010a
Dicromantispa synapsis Hoffman, 2002	Fênix, Tijucas do Sul, Guaratuba, Pontal do Itararé	Machado and Rafael 2010a
Entanoneura batesella (Westwood, 1867)	Guaraúna (Teixeira Soares)	Penny and da Costa 1983
Gerstaeckerella gigantea Enderlein, 1910	Guaraúna (Teixeira Soares)	Penny and da Costa 1983
Gerstaeckerella irrorata (Erichson, 1839)	Guaraúna (Teixeira Soares)	Penny and da Costa 1983
Leptomantispa ariasi (Penny, 1982)	Morretes	Machado and Rafael 2010a
Leptomantispa axillaris (Navás, 1908)	Campo do Tenente	Machado and Rafael 2010a
*Paramantispa ambusta (*Erichson, 1839)	Ponta Grossa, Lapa	Penny and da Costa 1983
Paramantispa prolixa (Erichson, 1839)	Curitiba, Lapa, Vila Velha, Quatro Barras	Penny and da Costa 1983
Trichoscelia varia (Walker, 1853*)*	Ponta Grossa	Carvalho and Corseuil 1991.
Zeugomantispa compellens (Walker, 1860)	Morretes	Machado and Rafael 2010a
Zeugomantispa virescens (Rambur, 1842)	Jaguariaíva, Castro, Morretes, Rio Nhundiaquara	Machado and Rafael 2010a; this study
Myrmeleontidae		
Amoea chlorops (Blanchard, 1845) *	Guarapuava	This study
Argentoleon irrigatus Gerstaecker, 1893 *	Colombo	This study
Ascalorphne macrocerca (Burmeister, 1839) *	Fênix, São José dos Pinhais, Ponta Grossa, Telêmaco Borba	This study
Cordulecerus alopecinus (Burmeister, 1839) *	Fênix	This study
Glenurus peculiaris (Walker, 1860)	Foz do Iguaçu, Morretes, Rolândia	Machado 2020
Haploglenius costatus (Burmeister, 1839) *	Fênix, Antonina, Ponta Grossa, Colombo, São José dos Pinhais, Guarapuava, Telêmaco Borba	This study
Myrmeleon (*Myrmeleon*) *pallidipes* Banks, 1920	Jaguariaíva	Navás 1923
Navasoleon brasiliensis Miller, 2018	Virmond	Stange and Miller 2018
Osmylidae		
Isostenosmylus barbatus Martins, Ardila-Camacho, Flint & Stange, 2019	Ponta Grossa, São José dos Pinhais	Martins et al. 2019
*Isostenosmylus pulverulentus (*Gerstaecker, 1894)	Curitiba, Campina Grande do Sul, Ponta Grossa, São José dos Pinhais, Paranaguá, Quatro Barras, Prudentópolis	Martins et al. 2019, This study
Sisyridae		
Climacia insolita Flint, 1998	Guarapuava, Prudentópolis, Telêmaco Borba	Flint (1998); this study
Climacia triplehorni Flint, 1998 *	Guarapuava, Telêmaco Borba, Ponta Grossa	This study
Sisyra apicalis Banks, 1908 *	Guarapuava, Telêmaco Borba	This study

Pinhais, Serra do Mar BR 277 km 54; 25°34′00″S, 049° 01′00″W; 02.XII.1986; 1♀ and 1 ♂; DZUP 381709; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR.

Identification. This species is distinguished from other Brazilian species by the combination of characters presented in the identification key of Martins and Amorim (2016): hind wing with radial posterior (RP) vein branching from the radial anterior (RA) vein near the middle of wing length, and M unforked; head without a protruding projection; in males gonocoxite 9 sickle-like.

Comments. Prior to this work, only two species of coniopterygids were reported from Paraná: *Coniopteryx* (*Scotoconiopteryx*) *paranana* Meinander, 1990 and *Coniopteryx* (*Coniopteryx*) *simplicior* Meinander, 1972.

Updated distribution in Brazil: Ceará, Pará, Paraná, Santa Catarina.

Family Dilaridae Newman, 1853
Subfamily Nallachiinae Navás, 1914
Genus *Nallachius* Navás, 1909

***Nallachius reductus* Carpenter, 1947**

Material examined. BRAZIL – **Paraná** • Fênix, Reserva Estd. de Vila Rica (ITCF); 23°54′51″S, 051°57′ 45″W; 02.XII.1986, 2 ♂; DZUP 381750; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR.

Identification. This species is similar to *Nallachius prestoni* (McLachlan, 1880) but can be differentiated by the longer gonostyli 10 and much lighter wing marks (Carpenter 1970); in addition, *N. prestoni* is recorded in Brazil only from Rio de Janeiro state. *Nallachius reductus* is also similar to *N. potiguar* Machado & Rafael, 2010, which can be distinguished by its unforked costal crossvein and geographical distribution (Machado and Rafael 2010b).

Comments. *Nallachius reductus* was previously reported only from Paraguay. The only *Nallachius* species previously known from Paraná was *N. limai* Adams, 1970 (Machado and Martins 2021).

Updated distribution in Brazil: Paraná.

Family Hemerobiidae Latreille, 1802
Subfamily Sympherobiinae Comstock, 1918
Genus *Sympherobius* Banks, 1905

***Sympherobius* sp.**

Material examined. BRAZIL - **Paraná** • Colombo, Embrapa BR 476 KM 20; 25°20′00″S, 049°14′00″W; 27.III.19872; 1 ♂; DZUP 381707; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR.

Identification. This genus is distinguished from the other Brazilian genera by the presence of two RP in the forewing, with the first RP branching before the origin of the second RP. Additionally, forewing is not "beaded" along the longitudinal veins (Penny and Monserrat 1983).

Comments. Four species of *Sympherobius* occur in Brazil, and only one species from southern Brazil was reported prior to this study: *Sympherobius gayi* Navás, 1910 from Rio Grande do Sul state (Lara and Perioto 2016).

Updated distribution in Brazil: Paraná.

Family Myrmeleontidae Latreille, 1802 (sensu Machado et al. 2019)
Subfamily Ascalaphinae Lefèbvre, 1842
Tribe Haplogleniini Newman, 1853
Genus *Amoea* Lefebvre, 1842

***Amoea chlorops* (Blanchard, 1845)**

Material examined. BRAZIL – **Paraná** • Antonina, Reserva Sapitanduva; 25°28′00″S, 048°50′00″W; 30.XI. 1986; 1 ♂; DZUP 381643; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR.

Identification. According to Penny (1981), the genus *Amoea* is characterized by having the eyes not divided transversely, the antennae longer than the distance to the second RP fork on the forewing, and the hind wing with 2A absent or extremely short. According to van der Weele (1908), *A. chlorops* is quite similar to *A. immaculata* (Olivier, 1790), but *A. chlorops* can be distinguished from the latter species based on its smaller size, unconstructed wings tip, yellow or brownish subcostal field, and the geographic distribution (van der Weele 1908; Machado and Martins 2021).

Comments. Four species of this genus occur in Brazil (Machado and Martins 2021). Penny (1981) pointed out the need for a taxonomic revision of the group, which is still necessary.

Updated distribution in Brazil. Bahia, Espírito Santo, Paraná, Rio de Janeiro, Santa Catarina.

Genus *Haploglenius* Burmeister, 1839

***Haploglenius costatus* (Burmeister, 1839)**

Material examined. BRAZIL - **Paraná** • Fênix, Reserva Estadual Vila Rica (ITCF); 23°54′51″S, 051°57′45″W; ?.?.1986, 04.X.1986, 02.XI.1986, 03.XI.1986, 29.XI.1986, 30.XI.1986, 02.XII.1986, ?.?.1987; 6 ♀ and 3 ♂; DZUP 381659, DZUP 381662, DZUP 381675, DZUP 381662, DZUP 381678, DZUP 381676, DZUP 381660; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • Telêmaco Borba, Reserva Biológica Klabin; 24°17′00″S, 050°37′00″W; 07.I.1987; 1 ♂; DZUP 381663; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • Ponta Grossa, Vila Velha res. IAPAR BR 376; 25°13′02″S, 050°02′14″W; 01.I.1987, 26.I.1987, 27.I.1987, 29.I.1987, 30.I.1987, 31.I.1987, 27.II.1987; 5 ♀ and 3 ♂; DZUP 381661, DZUP 381664, DZUP 381665, DZUP 381668, DZUP 381671, DZUP 381672, DZUP 381666; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • Guarapuava, Estan. Águas de Santa Clara; 25°40′00″S, 052°01′00″W: 28.III.1987; 1 ♀ and 1 ♂; DZUP 381667, DZUP 3816924; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • Antonina, Reserva Sapitanduva; 25°28′00″S, 048°50′00″W; 29.XII.1986, 28.II.1987; 2 ♀;

DZUP 381674, DZUP 381673; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • São José do Pinhais, Serra do Mar BR 277 km 54; 25°34′00″S, 049°01′00″W; 30.I.1987; 1♀; DZUP 381670; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • Colombo, Embrapa BR 476 km 20; 25°20′00″S, 049°14′00″W; 30.I.1987; 1 ♂; DZUP 381669; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR.

Identification. *Haploglenius* is a distinctive genus characterized by the generally dark anterior wing costal area, hind wing with 2A long, and a pronotal flap in the males (Penny 1981; Eisner and Adams 1975). *Haploglenius costatus* can be identified in that the hind margin of forewing has the anal projection slightly developed with a concave intrusion, and the wings have brown costal areas (Ábrahám 2013).

Comments. *Haploglenius costatus* was the most collected species of Ascalaphinae in this study. Currently five species are known to Brazil, and *H. costatus* also occurs in several other Neotropical countries and is widespread in Brazil, with records in the north, northeast, and central-west regions (Machado and Martins 2021); herein, we provide the first known occurrences in the southern region of Brazil.

Updated distribution in Brazil. Amazonas, Bahia, Mato Grosso, Rondônia, Tocantins, Pará, Paraná.

Tribe Ululodini Van der Weele, 1908
Genus *Ascalorphne* Banks, 1915

***Ascalorphne macrocerca* (Burmeister, 1839)**

Material examined. BRAZIL – **Paraná** • PR, Antonina, Reserva Sapitanduva; 25°28′00″S, 048°50′00″W; 30.XII.1986, 31.I.1987, 32.I.1987, 26.II.1987, 27.III.1987, 28.III.1987; 4 ♀ and 3 ♂; DZUP 381654-381656, DZUP 381648, DZUP 381644, DZUP 381652; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • Fênix, Reserva Estadual Vila Rica (ITCF); 23°54′51″S, 051° 57′45″W; 01.I.1987; 1 ♀ and 1 ♂; DZUP 38164; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • Telêmaco Borba, Reserva Biológica Klabin; 24°17′00″S, 050°37′00″W; 26.II.1987,27.II.1987, 28.II.1987, 01.III.1987, 27.III.1987, 29.III.1987; 6 ♀ and 1 ♂; DZUP 381647, DZUP 381657, DZUP 381651, DZUP 381646, DZUP 381650, DZUP 381653; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • Ponta Grossa, Vila Velha res. IAPAR BR 376; 25°13′02″S, 050°02′14″W; 27.I.1987; 2 ♂; DZUP 381649; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR.

Identification. The genus *Ascalorphne* is readily recognized by the very distinctive axillary angle of the forewing and the antennae, which are longer than the forewing. The species is determined by the long antennae and by the whitish, piriform antennal club (Penny 1981).

Comments. The genus *Ascalorphne* has four described South American species, with two species occurring in Brazil: *A. impavida* (Walker, 1853) reported from Maranhão and Pará states, and *A. macrocerca* (Burmeister, 1839) from Bahia state (Penny 1981). We provide here several new records from Paraná.

Updated distribution in Brazil. Bahia, Paraná.

Genus *Cordulecerus* Rambur, 1842

***Cordulecerus alopecinus* (Burmeister, 1839)**

Material examined. BRAZIL – **Paraná** • Fênix, Reserva Estadual Vila Rica (ITCF); 23°54′51″S, 051°57′45″W; 03. XII.1986; 1 ♀; DZUP 381658; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR.

Identification. Species of *Cordulecerus* are characterized by having trianguloid wings usually dark pigmented and the hind wing with a sinuous CuP (Penny 1981). *Cordulecerus alopecinus* can be distinguished by the brown mark on the base of the hind wing and the yellow mesonotum with a central black mark (van der Weele 1908).

Comments. According to Ardila-Camacho et al. (2019), six species occur in Brazil, but until now only *C. subiratus* Walker, 1853 was known from southern region of Brazil, from Rio Grande do Sul state (Machado and Martins 2021). Herein, we report the first record of *C. alopecinus* from Fênix, Paraná. The species was previously known only from the states of Bahia, Espírito Santo, and São Paulo in Brazil, and from Argentina (Navás 1912). *Cordulecerus alopecinus* is one of the *Cordulecerus* species known to have aggregation behavior, and a group with more than 100 specimens has been reported from a conservation area in Espírito Santo state (Gomes-Filho 2000).

Updated distribution in Brazil. Bahia, Espírito Santo, Paraná, São Paulo.

Subfamily Myrmeleontinae Latreille, 1802
Tribe Brachynemurini Banks, 1927
Genus *Argentoleon* Stange, 1994

***Argentoleon irrigatus* (Gerstaecker, 1893)**

Material examined. BRAZIL – **Paraná** • Colombo, EMBRAPA BR 476 km 20; 25°20′00″S, 049°14′00″W; 27.III.1987; 1 ♀; DZUP 381682; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR.

Identification. *Argentoleon irrigatus* is distinguished by the following combination of characters: frons without setae, antenna short, forefemoral sense hair as long as forefemur length, forewing vein 2A running in a fairly even curve toward 3A, and cubital anterior vein (CuA) bending to hind margin at or before origin of medial fork. This species differs from *A. longitudinalis* (Navás, 1914) by the absence of a dark brown stripe in a mediocubital area of the fore wing (Stange 1994).

Comments. *Argentoleon irrigatus*, previously unreported from Paraná, is the fourth antlion species known from the state. The genus comprises two species: *A. longitudinalis*, which does not occur in Brazil, and *A. irrigatus*, with records from Argentina, Bolivia, Paraguay,

Uruguay, Venezuela, and Brazil (Machado and Martins 2021).

Updated distribution in Brazil. Amazonas, Minas Gerais, Paraná, São Paulo.

Family Sisyridae Banks, 1905
Genus *Climacia* McLachlan, 1869

***Climacia triplehorni* Flint, 1998**

Material examined. BRAZIL – **Paraná** • Guarapuava, Estância Águas de Santa Clara; 25°40′00″S, 052°01′00″W; 04.XI.1986; 1 ♀ and 4 ♂; DZUP 381928; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • Ponta Grossa, Vila Velha res. IAPAR BR 376; 25°13′02″S, 050°02′14″W; 04.XI.1986; 1 ♀ and 1 ♂; DZUP 381926; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • Telêmaco Borba, Reserva Biológica Klabin; 24°17′00″S, 050°37′00″W; 31.X.1986, 05.X.1986, 27.III.1987; 4 ♀ and 1 ♂; DZUP 381927, DZUP 381929, DZUP 381930; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR.

Identification. The genus *Climacia* is identified by the subcylindrical format of the terminal segment of maxillary palp and the species, and *C. triplehorni* is differentiated from its congeners by the presence of a conspicuous radiomedial streak on the forewing extending longitudinally but not reaching the anal margin, and also by the absence of spots throughout longitudinal veins. It can be differentiated from *C. insolita* Flint, 1998, which is closely related with *C. triplehorni*, for not having the radiomedial streak connected to other intervenational streaks on the forewing (Assmar and Salles 2017).

Comments. In Brazil, 11 species of *Climacia* have been recorded; however, only *C. insolita* was previously recorded to Paraná state. Herein, we report only the second species of *Climacia* occurring in this state.

Updated distribution in Brazil. Paraná, São Paulo, Santa Catarina.

Genus *Sisyra* Burmeister, 1839

***Sisyra apicalis* Banks, 1908**

Material examined. BRAZIL – **Paraná** • Guarapuava, Estância Águas de Santa Clara; 25°40′00″S, 052°01′00″W; 02.XII.1986, 31.III.1987; 2 ♂; DZUP 381711, DZUP 381931; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR • Telêmaco Borba, Reserva Biológica Klabin; 24°17′00″S, 050°37′00″W; 05.X.1987; 1 ♀ and 1 ♂; DZUP 381932; RC Marinoni and RRC Dutra leg.; light trap; PROFAUPAR.

Identification. According to Assmar and Salles (2017), this species can be identified by its straight, distally projected male gonocoxite 9, which has a rounded apex and curves internally in dorsal view.

Comments. This species has a wide distribution, occurring from the southern United States to Brazil. The genus includes six Neotropical species, all occurring in Brazil (Assmar and Salles 2017), but *Sisyra* has never been recorded in southern Brazil. Herein, we present the southernmost record of the genus in the country.

Updated distribution in Brazil. Amazonas, Bahia, Espírito Santo, Minas Gerais, Paraná, Pernambuco, Roraima.

Other species

Other Neuroptera families were also collected during PROFAUPAR (Appendix, Table A1), and although they are not newly recorded from Paraná, they are briefly discussed. Osmylidae was represented by *Isostenosmylus pulverulentus* (Gerstaecker, 1894) ($n = 4$); the family has three species reported from Brazil: *Gumila adspersus* Navás 1912 (Santa Catarina) and the genus *Isostenosmylus* Krüger, 1913 with two species: *I. pulverulentus*, most commonly collected and distributed in southeastern and southern Brazil (including Paraná), and *I. barbatus* Martins, Ardila-Camacho, Flint & Stange 2019, which was recently described from several locations in Paraná (Martins et al. 2019). Mantispidae was represented by *Zeugomantispa virescens* (Rambur, 1842) ($n = 9$), a widely distributed and commonly collected species in Brazil, and *Anchieta fumosella* (Westwood, 1867) ($n = 2$), sampled in Ponta Grossa. These two species were previously reported from Paraná state and represent two of the three subfamilies that occur in Brazil, Mantispinae and Symphrasinae, respectively. A total of 14 mantispid species have been recorded from Paraná. The Manispidae are the most diverse family of Neuroptera in the state (Machado and Martins 2021).

Discussion

The insects collected during PROFAUPAR proved to be diverse, highlighting the importance of large projects to study insect biodiversity and to deepen the knowledge of the local fauna. All families of Neuroptera known to occurr in Brazil were found in this project, except for Berothidae, which is represented in the country by two species occurring only in areas of northern and central Brazil (Machado and Krolow 2016; Lara and Perioto 2020). Including the new records of the present study—an increase in the neuropterofauna of Paraná by 29.2%—a total of 48 species of lacewings are now known to occur in the state.

Although some specimens were not identified to species, we consider the publication of these data important, as this study is the only large-scale survey in southern Brazil of the order Neuroptera; these data took almost 34 years to be studied and published; and little is known about the true diversity of Neuroptera, particularly in the South American countries like Brazil (Martins 2019).

In our study, Sisyridae and Chrysopidae were the families that with highest abundance of specimens. Sisyridae is one of the smallest neuropteran families, with 71 extant species worldwide (Oswald and Machado 2018); nevertheless, this group was the most representative in the PROFAUPAR samples (mainly *Climacia insolita*),

with records of both extant genera in the New World, *Climacia* and *Sisyra*. According to Assmar and Salles (2017), these two genera have only six species in the Atlantic rainforest, a number probably underestimated based on our results. Chrysopidae is the second most diverse neuropteran family in the world, with 1415 species and 81 genera (Oswald and Machado 2018), and it is considered the neuropteran family with the greatest number of species in South America (Martins 2019). However, only nine species are known from Paraná. The identification of Chrysopidae is complex due to the morphological similarity of some species, especially in the Neotropical genera, and the absence of identification keys for females. Therefore, in this work the Chrysopini females were presented separately (Appendix, Table A1).

Hemerobiidae was represented by three genera in our study; in Brazil, the family has six genera and 23 species (Lara and Perioto 2016). Despite being relatively common in collections, the information on these insects is scarce and further study should be encouraged, especially in connection to the importance of hemerobiids as biological control agents in other countries (Lara et al. 2008) and still unexplored in Brazil.

Myrmeleontidae (*sensu* Machado et al. 2019) was the family with the fourth highest abundance in our study, with 46 specimens sampled. Our study is the first to record owlflies (Myrmeleontidae, Ascalaphinae) in Paraná. The family Ascalaphidae has recently been classified as a subfamily within Myrmeleontidae based on molecular and morphological data (Machado et al. 2019; Jones 2019), and it is presented here as such. Within the Myrmeleontidae, specimens collected during the project all belong to the former Ascalaphidae (now Myrmeleontidae, Ascalaphinae) with the exception of *Argentoleon irrigatus* (Myrmeleontinae, Brachynemurini). At present, only three other species of Myrmeleontidae are recorded in Paraná: *Myrmeleon pallidipes* Banks, 1920,*Glenurus peculiaris* (Walker, 1860), and *Navasoleon brasiliensis* Miller, 2018, which was only recently described (Stange and Miller 2018), suggesting that the diversity of these insects is underestimated.

Coniopterygidae was found to be the family with the least diversity and abundance, represented only by *Coniopteryx* (*S.*) *tucumana*. This family is widely distributed in Brazil, with 46 species and four genera known: *Coniopteryx*, *Neoconis* Enderlein, 1930, *Semidalis* Enderlein, 1905, and *Incasemidalis* Meinander, 1972; the latter genus was only recently reported from Brazil by Martins and Amorim (2016), which demonstrates the poor knowledge of this family in the country. The least abundant family in our study was Dilaridae, which is a rare group of insects in entomological collections and biologically little-known, especially the adults (Lara and Perioto 2017). The family is represented by four genera worldwide, but *Nallachius* is the only genus occurring in Brazil and distributed in all regional divisions of the country, with 11 species known (Machado and Rafael 2010b).

Over the course of more than three decades, the eight study areas have suffered greatly from fragmentation, especially Antonina, Colombo, and Jundiai do Sul, which can be seen in satellite images as green patches surrounded by buildings and crops. The Parque Estadual de Vila Velha (Ponta Grossa) and Parque Ecológico Samuel Klabin (Telêmaco Borba) are also now surrounded by urban areas and crops; however, they are protected areas, either public or private, respectively. Due to urban expansion over the years, the boundaries between cities have changed, so that the geographic coordinates of Guarapuava study area is now located in the municipality of Foz do Jordão, but we decided to keep the name of the collection point, as originally presented by Marinoni and Dutra (1991), to facilitate understanding in later studies. We believe that new studies at these locations may help us to understand the effects of urbanization on the insect fauna over time.

We highlight that all the study areas are within the Atlantic Forest, which is a biodiversity hotspot. The Atlantic Forest is one of the Brazilian biomes most impacted by deforestation due to agriculture and urbanization. Nowadays, only 12.4% of the original extent of the Atlantic Forest remains, and despite the expansion of protected and reforested areas, deforestation rates continue, increasing by 27% in 2018–2019 (Fundação SOS Mata Atlântica 2020). Paraná is the state which has the third highest contributions towards deforestation of the Atlantic Forest. Our study, in increasing in the number of neuropteran species known in the state and providing the first record of *Nallachius reductus* in the country, shows the importance of projects with large temporal and geographical sampling of insects. Such projects can provide the necessary data to better understand the Brazilian entomofauna, especially for the neglected insect groups like Neuroptera. According to Machado and Martins (2021), Paraná is the ninth most diverse Brazilian state; however, our results suggest that possibly only a fraction of the real diversity of Neuroptera is known.

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Authors' Contributions

Formal analysis: PAS. Writing – original draft: PAS. Writing – review and editing: PAS, RJPM. Data curation: RJM. Supervision: RJPM.

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Appendix

Table A1. Neuroptera (Insecta) collected by the PROFAUPAR project (1986–1987).

Taxon	Locality	Date	Sex	*n*	Method	Voucher no.
Myrmelontidae						
Argentoleon irrigatus Gerstaecker, 1893	Embrapa BR 476 KM 202 (Colombo/PR)	27 iii 1987	F	1	light trap	DZUP 381682
Amoea chlorops (Blanchard, 1845)	Reserva Sapitanduva (Antonina/PR)	30 xi 1986	M	1	light trap	DZUP 381643
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Sapitanduva (Antonina/PR)	27 iii 1987	M	1	light trap	DZUP 381644
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	01 i 1987	M	1	light trap	DZUP 381645
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	01 i 1987	F	1	light trap	DZUP 381645
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Biologica Klabin (Telemaco Borba/PR)	01 iii 1987	F	2	light trap	DZUP 381646
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Biologica Klabin (Telemaco Borba/PR)	26 ii 1987	F	2	light trap	DZUP 381647
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Sapitanduva (Antonina/PR)	26 ii 1987	F	1	light trap	DZUP 381648
Ascalorphne macrocerca (Burmeister, 1839)	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	27 i 1987	M	2	light trap	DZUP 381649
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Biologica Klabin (Telemaco Borba/PR)	27 iii 1987	F	1	light trap	DZUP 381650
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Biologica Klabin (Telemaco Borba/PR)	28 ii 1987	M	1	light trap	DZUP 381651
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Sapitanduva (Antonina/PR)	28 iii 1987	F	2	light trap	DZUP 381652
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Biologica Klabin (Telemaco Borba/PR)	29 iii 1987	F	1	light trap	DZUP 381653
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Sapitanduva (Antonina/PR)	30 xii 1986	M	1	light trap	DZUP 381654

Taxon	Locality	Date	Sex	*n*	Method	Voucher no.
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Sapitanduva (Antonina/PR)	31 i 1987	M	1	light trap	DZUP 381655
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Sapitanduva (Antonina/PR)	32 i 1987	F	1	light trap	DZUP 381656
Ascalorphne macrocerca (Burmeister, 1839)	Reserva Biologica Klabin (Telemaco Borba/PR)	27 ii 1987	M	1	light trap	DZUP 381657
Cordulecerus alopecinus (Burmeister, 1839)	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	03 xii 1986	F	1	light trap	DZUP 381658
Haploglenius costatus (Burmeister, 1839)	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	? ? 1986	M	1	light trap	DZUP 381659
Haploglenius costatus (Burmeister, 1839)	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	? ? 1987	F	1	light trap	DZUP 381660
Haploglenius costatus (Burmeister, 1839)	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	01 i 1987	F	1	light trap	DZUP 381661
Haploglenius costatus (Burmeister, 1839)	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	03 xi 1986	F	1	light trap	DZUP 381662
Haploglenius costatus (Burmeister, 1839)	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	04 x 1986	F	1	light trap	DZUP 381662
Haploglenius costatus (Burmeister, 1839)	Reserva Biologica Klabin (Telemaco Borba/PR)	07 i 1987	M	1	light trap	DZUP 381663
Haploglenius costatus (Burmeister, 1839)	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	26 i 1987	F	1	light trap	DZUP 381664
Haploglenius costatus (Burmeister, 1839)	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	27 i 1987	F	2	light trap	DZUP 381665
Haploglenius costatus (Burmeister, 1839)	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	27 ii 1987	M	1	light trap	DZUP 381666
Haploglenius costatus (Burmeister, 1839)	Estan. Agua de Santa Clara (Guarapuava/PR)	28 iii 1987	F	1	light trap	DZUP 381667
Haploglenius costatus (Burmeister, 1839)	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	29 i 1987	M	1	light trap	DZUP 381668
Haploglenius costatus (Burmeister, 1839)	Embrapa BR 476 KM 202 (Colombo/PR)	30 i 1987	M	1	light trap	DZUP 381669
Haploglenius costatus (Burmeister, 1839)	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	30 i 1987	F	1	light trap	DZUP 381670
Haploglenius costatus (Burmeister, 1839)	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	30 i 1987	F	1	light trap	DZUP 381671
Haploglenius costatus (Burmeister, 1839)	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	31 i 1987	M	1	light trap	DZUP 381672
Haploglenius costatus (Burmeister, 1839)	Reserva Sapitanduva (Antonina/PR)	28 ii 1987	F	1	light trap	DZUP 381673
Haploglenius costatus (Burmeister, 1839)	Reserva Sapitanduva (Antonina/PR)	29 xii 1986	F	1	light trap	DZUP 381674
Haploglenius costatus (Burmeister, 1839)	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xi 1986	M	1	light trap	DZUP 381675
Haploglenius costatus (Burmeister, 1839)	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xii 1986	F	1	light trap	DZUP 381676
Haploglenius costatus (Burmeister, 1839)	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	29 xi 1986	F	2	light trap	DZUP 381677
Haploglenius costatus (Burmeister, 1839)	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	30 xi 1986	M	1	light trap	DZUP 381678
Haploglenius costatus (Burmeister, 1839)	Estan. Agua de Santa Clara (Guarapuava/PR)	23 xi 1986	M	1	light trap	DZUP 381924
Osmylidae						
Isostenosmylus pulverulentus (Gerstaecker, 1894)	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	02 xii 1986	M	1	light trap	DZUP 381679
Isostenosmylus pulverulentus (Gerstaecker, 1894)	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	02 xi 1986	M	1	light trap	DZUP 381680
Isostenosmylus pulverulentus (Gerstaecker, 1894)	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	02 xi 1986	F	1	light trap	DZUP 381680
Isostenosmylus pulverulentus (Gerstaecker, 1894)	Estan. Agua de Santa Clara (Guarapuava/PR)	28 iii 1987	M	1	light trap	DZUP 381681
Dilaridae					light trap	
Nallachius reductus Carpenter, 1947	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xii 1986	M	2	light trap	DZUP 381750
Mantispidae						
Anchieta fumosella (Westwood, 1867)	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	01 i 1987	M	1	light trap	DZUP 381683
Anchieta fumosella (Westwood, 1867)	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	02 i 1987	M	1	light trap	DZUP 381684
Zeugomantispa virescens (Rambur, 1842)	Fazenda Monte Verde (Jundiaí do Sul/PR)	04 viii 1986	F	1	light trap	DZUP 381685
Zeugomantispa virescens (Rambur, 1842)	Fazenda Monte Verde (Jundiaí do Sul/PR)	21 iii 1987	M	1	light trap	DZUP 381686
Zeugomantispa virescens (Rambur, 1842)	Fazenda Monte Verde (Jundiaí do Sul/PR)	27 iii 1987	M	2	light trap	DZUP 381687
Zeugomantispa virescens (Rambur, 1842)	Estan. Agua de Santa Clara (Guarapuava/PR)	28 ii 1987	M	1	light trap	DZUP 381688
Zeugomantispa virescens (Rambur, 1842)	Fazenda Monte Verde (Jundiaí do Sul/PR)	29 iii 1987	F	2	light trap	DZUP 381689
Zeugomantispa virescens (Rambur, 1842)	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	30 i 1987	M	1	light trap	DZUP 381690
Zeugomantispa virescens (Rambur, 1842)	Reserva Sapitanduva (Antonina/PR)	31 i 1987	M	1	light trap	DZUP 381691
Hemerobiidae						
Hemerobius sp. Linnaeus, 1758	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	27 ii 1987	M	5	light trap	DZUP 381692
Hemerobius sp. Linnaeus, 1758	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	27 ii 1987	F	7	light trap	DZUP 381692
Hemerobius sp. Linnaeus, 1758	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	01 i 1987	M	4	light trap	DZUP 381693
Hemerobius sp. Linnaeus, 1758	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	02 i 1987	M	5	light trap	DZUP 381694
Hemerobius sp. Linnaeus, 1758	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	02 i 1987	F	2	light trap	DZUP 381694
Hemerobius sp. Linnaeus, 1758	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	02 xii 1986	F	2	light trap	DZUP 381695
Hemerobius sp. Linnaeus, 1758	Embrapa BR 476 KM 202 (Colombo/PR)	03 viii 1986	F	1	light trap	DZUP 381696
Hemerobius sp. Linnaeus, 1758	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	04 xi 1986	M	4	light trap	DZUP 381697
Hemerobius sp. Linnaeus, 1758	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	04 xi 1986	F	1	light trap	DZUP 381697
Hemerobius sp. Linnaeus, 1758	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	27 ii 1987	M	5	light trap	DZUP 381698
Hemerobius sp. Linnaeus, 1758	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	27 ii 1987	F	7	light trap	DZUP 381698
Hemerobius sp. Linnaeus, 1758	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	30 i 1987	F	1	light trap	DZUP 381699
Hemerobius sp. Linnaeus, 1758	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	31 i 1987	F	2	light trap	DZUP 381699
Hemerobius sp. Linnaeus, 1758	Fazenda Monte Verde (Jundiaí do Sul/PR)	31 iii 1987	F	1	light trap	DZUP 381700
Nusalala sp. Navás, 1913	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	27 ii 1987	M	1	light trap	DZUP 381701
Nusalala sp. Navás, 1913	Embrapa BR 476 KM 202 (Colombo/PR)	01 xi 1986	F	1	light trap	DZUP 381702
Nusalala sp. Navás, 1913	Embrapa BR 476 KM 202 (Colombo/PR)	03 viii 1986	M	1	light trap	DZUP 381703
Nusalala sp. Navás, 1913	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	27 ii 1987	M	1	light trap	DZUP 381704
Nusalala sp. Navás, 1913	Fazenda Monte Verde (Jundiaí do Sul/PR)	27 iii 1987	F	1	light trap	DZUP 381705

Taxon	Locality	Date	Sex	*n*	Method	Voucher no.
Nusalala sp. Navás, 1913	Fazenda Monte Verde (Jundiaí do Sul/PR)	29 iii 1987	F	1	light trap	DZUP 381706
Sympherobius sp. Banks, 1905	Embrapa BR 476 KM 202 (Colombo/PR)	27 iii 1987	M	1	light trap	DZUP 381707
Coniopterygidae						
Coniopteryx sp. Curtis, 1834	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	04 xi 1986	F	1	light trap	DZUP 381708
Coniopteryx (*Scotoconiopteryx*) *tucumana* Navás, 1930	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	02 xii 1986	F	1	light trap	DZUP 381709
Coniopteryx (*Scotoconiopteryx*) *tucumana* Navás, 1930	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	02 xii 1986	M	1	light trap	DZUP 381709
Sisyridae						
Climacia insolita Flint, 1998	Estan. Agua de Santa Clara (Guarapuava/PR)	29 xi 1986	M	7	light trap	DZUP 381710
Climacia insolita Flint, 1998	Estan. Agua de Santa Clara (Guarapuava/PR)	29 xi 1986	F	12	light trap	DZUP 381710
Climacia insolita Flint, 1998	Estan. Agua de Santa Clara (Guarapuava/PR)	02 xi 1986	M	22	light trap	DZUP 381712
Climacia insolita Flint, 1998	Estan. Agua de Santa Clara (Guarapuava/PR)	02 xi 1986	F	17	light trap	DZUP 381712
Climacia insolita Flint, 1998	Reserva Biologica Klabin (Telemaco Borba/PR)	31 x 1986	M	1	light trap	DZUP 381925
Climacia insolita Flint, 1998	Reserva Biologica Klabin (Telemaco Borba/PR)	31 x 1986	F	1	light trap	DZUP 381925
Climacia triplehorni Flint, 1998	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	04 xi 1986	M	1	light trap	DZUP 381926
Climacia triplehorni Flint, 1998	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	04 xi 1986	F	1	light trap	DZUP 381926
Climacia triplehorni Flint, 1998	Reserva Biologica Klabin (Telemaco Borba/PR)	27 iii 1987	F	1	light trap	DZUP 381927
Climacia triplehorni Flint, 1998	Estan. Agua de Santa Clara (Guarapuava/PR)	04 xi 1986F	F	1	light trap	DZUP 381928
Climacia triplehorni Flint, 1998	Estan. Agua de Santa Clara (Guarapuava/PR)	04 xi 1986F	M	4	light trap	DZUP 381928
Climacia triplehorni Flint, 1998	Reserva Biologica Klabin (Telemaco Borba/PR)	31 x 1986	F	1	light trap	DZUP 381929
Climacia triplehorni Flint, 1998	Reserva Biologica Klabin (Telemaco Borba/PR)	31 x 1986	M	1	light trap	DZUP 381929
Climacia triplehorni Flint, 1998	Reserva Biologica Klabin (Telemaco Borba/PR)	05 x 1986	F	2	light trap	DZUP 381930
Sisyra apicalis Banks, 1908	Estan. Agua de Santa Clara (Guarapuava/PR)	02 xii 1986	M	1	light trap	DZUP 381711
Sisyra apicalis Banks, 1908	Estan. Agua de Santa Clara (Guarapuava/PR)	31 iii 1987	M	1	light trap	DZUP 381931
Sisyra apicalis Banks, 1908	Reserva Biologica Klabin (Telemaco Borba/PR)	05 x 1986	M	1	light trap	DZUP 381932
Sisyra apicalis Banks, 1908	Reserva Biologica Klabin (Telemaco Borba/PR)	05 x 1986	F	1	light trap	DZUP 381932
Chrysopidae						
Asthenochrysa sp. Adams & Penny, 1992	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xi 1986	F	1	light trap	DZUP 381713
Chrysoperla sp. Steinmann, 1964	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	30 i 1987	M	2	light trap	DZUP 381714
Chrysoperla sp. Steinmann, 1964	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	02 i 1987	F	1	light trap	DZUP 381715
Chrysoperla sp. Steinmann, 1964	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	02 i 1987	M	3	light trap	DZUP 381715
Chrysoperla sp. Steinmann, 1964	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	27 i 1987	M	2	light trap	DZUP 381716
Chrysoperla sp. Steinmann, 1964	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	01 i 1987	M	1	light trap	DZUP 381717
Chrysopini sp. Schneider, 1851	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	28 iii 1987	F	1	light trap	DZUP 381718
Chrysopini sp. Schneider, 1851	Estan. Agua de Santa Clara (Guarapuava/PR)	29 xi 1986	F	1	light trap	DZUP 381719
Chrysopini sp. Schneider, 1851	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	02 xii 1986	F	1	light trap	DZUP 381720
Chrysopini sp. Schneider, 1851	Reserva Biologica Klabin (Telemaco Borba/PR)	29 iii 1987	F	1	light trap	DZUP 381721
Chrysopini sp. Schneider, 1851	Reserva Biologica Klabin (Telemaco Borba/PR)	01 xi 1986	F	1	light trap	DZUP 381722
Chrysopini sp. Schneider, 1851	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	? xi 1986	F	1	light trap	DZUP 381723
Chrysopini sp. Schneider, 1851	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xi 1986	F	4	light trap	DZUP 381723
Chrysopini sp. Schneider, 1851	Serra do Mar br 277 km 54 (São José dos Pinhais/PR)	04 xi 1986	F	5	light trap	DZUP 381724
Chrysopini sp. Schneider, 1851	Fazenda Monte Verde (Jundiaí do Sul/PR)	29 iii 1987	F	1	light trap	DZUP 381725
Chrysopini sp. Schneider, 1851	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	04 xi 1986	F	1	light trap	DZUP 381726
Chrysopini sp. Schneider, 1851	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xi 1986	F	4	light trap	DZUP 381734
Chrysopini sp. Schneider, 1851	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	04 xi 1986	M	1	light trap	DZUP 381736
Chrysopini sp. Schneider, 1851	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xi 1986	M	1	light trap	DZUP 381737
Chrysopodes sp. Navás, 1913	Estan. Agua de Santa Clara (Guarapuava/PR)	28 ii 1987	F	1	light trap	DZUP 381727
Chrysopodes sp. Navás, 1913	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xi 1986	F	1	light trap	DZUP 381728
Chrysopodes sp. Navás, 1913	Fazenda Monte Verde (Jundiaí do Sul/PR)	27 iii 1987	M	1	light trap	DZUP 381729
Chrysopodes sp. Navás, 1913	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	04 xi 1986	F	1	light trap	DZUP 381730
Chrysopodes (Chrysopodes) sp. Navás, 1913	Estan. Agua de Santa Clara (Guarapuava/PR)	02 xii 1986	M	1	light trap	DZUP 381731
Chrysopodes (Chrysopodes) sp. Navás, 1913	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	03 xi 1986	F	1	light trap	DZUP 381732
Chrysopodes (Chrysopodes) sp. Navás, 1913	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xi 1986	M	1	light trap	DZUP 381733
Chrysopodes (Chrysopodes) sp. Navás, 1913	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xi 1986	M	1	light trap	DZUP 381734
Nacarina sagitta de Freitas & Penny, 2001	Reserva Biologica Klabin (Telemaco Borba/PR)	29 iii 1987	M	1	light trap	DZUP 381738
Nacarina sagitta de Freitas & Penny, 2001	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	04 x 1986	F	1	light trap	DZUP 381739
Nacarina sagitta de Freitas & Penny, 2001	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	29 xi 1986	M	1	light trap	DZUP 381740
Nacarina sagitta de Freitas & Penny, 2001	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	? xi 1986	F	1	light trap	DZUP 381741
Nacarina sagitta de Freitas & Penny, 2001	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xi 1986	M	2	light trap	DZUP 381742
Nacarina sagitta de Freitas & Penny, 2001	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xi 1986	F	1	light trap	DZUP 381742
Plesiochrysa brasiliensis (Schneider, 1851)	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xi 1986	M	1	light trap	DZUP 381737
Plesiochrysa brasiliensis (Schneider, 1851)	Vila Velha res. IAPAR BR 376 (Ponta Grossa/PR)	01 i 1987	M	1	light trap	DZUP 381735
Plesiochrysa sp. Adams, 1982	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	04 xi 1986	M	1	light trap	DZUP 381743
Plesiochrysa sp. Adams, 1982	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xi 1986	F	1	light trap	DZUP 381744

Taxon	Locality	Date	Sex	*n*	Method	Voucher no.
Plesiochrysa sp. Adams, 1982	Fazenda Monte Verde (Jundiaí do Sul/PR)	27 iii 1987	F	1	light trap	DZUP 381745
Plesiochrysa sp. Adams, 1982	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	30 i 1987	F	3	light trap	DZUP 381746
Plesiochrysa sp. Adams, 1982	Reserva Estd. de Vila Rica (ITCF) (Fênix/PR)	02 xi 1986	M	2	light trap	DZUP 381747
Plesiochrysa sp. Adams, 1982	Estan. Agua de Santa Clara (Guarapuava/PR)	31 iii 1987	F	1	light trap	DZUP 381748
Plesiochrysa sp. Adams, 1982	Serra do Mar BR 277 km 54 (São José dos Pinhais/PR)	02 xii 1986	F	1	light trap	DZUP 381749